REMARKS

Favorable reconsideration of this application is respectfully requested in view of the following remarks.

Applicants thank Examiner King for his careful examination of this application and for returning initialed copies of the forms PTO-1449 accompanying the Information Disclosure Statements filed on August 25, 2003 and February 21, 2003.

Applicants have canceled Claims 1 and 9-17. Thus, only Claims 2-8 are currently at issue in this application, with Claim 2 being the only independent claim.

Claim 2 is directed to a braking force distribution control device that comprises a wheel speed detecting means which detects respective vehicle wheel speeds and a road surface μ slope estimating means which estimates the slopes of a coefficient of friction μ between the wheel and a road surface based on the detected wheel speeds. A control means distributes braking forces to the respective wheels based on the road surface μ slopes that are estimated for the respective wheels by the road surface μ slope estimating means. On the basis of the detected wheel speeds, the road surface μ slope estimating means estimates the road surface μ slopes of the braking forces with respect to wheel slip speeds as the road surface μ slopes for the respective wheels. The control means controls a braking torque of the wheel that is the object of control based on the road surface μ slope of the wheel that is an object of control and the road surface μ slope of a reference wheel among the road surface μ slopes estimated by the road surface μ slip estimating means.

The Official Action rejects Claims 2-8 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,836,618 to *Wakata et al.* in view of European Patent No. 0 887 241 to *Yamaguchi et al.* That rejection is respectfully traversed for at least the following reasons

Wakata et al. discloses a braking system including an anti-skid control function for preventing the locking of the wheels caused by rapid braking The anti-skid control function includes lowering the hydraulic pressure to the wheels that are slipping or in a locked state, and increasing the hydraulic pressure to the wheels that can exert more braking force before slipping. The respective wheels are determined to be in the locking state by measuring the skid ratio, which is a ratio between the velocity of the automobile Vb and the detected velocity of the particular wheel. In step 1003 of the flowchart shown in Fig. 6 of *Wakata et al.*, the vehicle speed Vb is calculated on the basis of the respective wheel speeds Vfl, Vfr, Vrl and Vrr immediately prior to braking. After braking begins, the velocity of the automobile is calculated by detecting the automobile's deceleration and the time period since braking began. The slip ratio is the ratio between the calculated velocity of the automobile Vb and the detected velocity of the respective wheel Vfl, Vfr, Vrl, Vrr. The slip ratio is calculated for each wheel and when the slip ratio is too great the hydraulic pressure is decreased. When the slip ratio is too small the hydraulic pressure is increased.

Yamaguchi et al. discloses a road surface condition estimating apparatus including a converting portion having a table showing a relation among a vehicle

speed (v), a braking force (Pc) and a resonance gain (Gd) for each road surface condition, e.g. snow, dry pavement or dirt roads. The vehicle speed and braking force is detected and converted into a resonance gain Gd on the basis of the table. A subtracting device computes the differences between the resonance gain for each road surface condition and the detected value of the input resonance gain Gd. A minimum value selecting portion selects a minimum value among the computed values in the subtracting device. The apparatus identifies the road surface condition corresponding to the minimum value of the resonance gain. *Yamaguchi et al.* discloses that it is possible to calculate the condition of the road surface on which the vehicle currently runs and the peak μ value of the road surface, and that it is possible to perform a stabilizing control of the vehicle such as VAC, ABS, TRC and the like, to warn the driver of the read surface condition, and to estimate each of the vehicle conditions such as the vehicle lateral slip angle, the yaw rate and the like.

If one were somehow motivated to combine the disclosures in *Wakata et al.* and *Yamaguchi et al.* as proposed in the Official Action, the result would not be a braking force distribution control device which includes, in combination with the other features recited in Claim 2, a road surface μ slope estimating means that estimates, on the basis of the detected wheel speeds, slopes of braking forces with respect to wheel slip speed as the road surface slopes for the respective wheels, and a control means that controls the braking torque of the wheel which is an object of control on the basis of the road surface μ slope of the wheel which is an object of control and

the road surface µ slope of a reference wheel among the road surface µ slopes estimated by the road surface µ slope estimating means.

While *Wakata et al.* discloses measuring each individual wheel's slip ratio and adjusting the hydraulic pressure to each wheel with reference to a target slip ratio, there is no disclosure of providing a road surface µ slope estimating means that estimates based on detected wheel speeds the slopes of braking forces with respect to wheel slip speed as the road surface slopes for the respective wheels, and a control means that controls the braking torque of the wheel which is an object of control on the basis of the road surface µ slope of the wheel which is an object of control and the road surface µ slope of a reference wheel among the road surface µ slopes estimated by the road surface µ slope estimating means. Also, *Yamaguchi et al.* discloses performing a stabilizing control of the vehicle such as VSC, ABS, TRC and the like with reference to the peak µ value of the particular detected road surface. However, *Yamaguchi et al.* also does not describe providing a road surface µ slope estimating means that estimates based on detected wheel speeds the slopes of braking forces with respect to wheel slip speed as the road surface slopes for the respective wheels, and a control means that controls the braking torque of the wheel which is an object of control on the basis of the road surface µ slope of the wheel which is an object of control and the road surface µ slope of a reference wheel among the road surface µ slopes estimated by the road surface µ slope estimating means. Considering that both documents are deficient in this regard, it cannot be said that combining the disclosures in *Wakata et al.* and *Yamaguchi et al.*

would have directed one to do that which is defined in Claim 2 as the invention. It is thus submitted that Claim 2 is allowable.

Claims 3-8 are also allowable at least by virtue of their dependence upon allowable independent Claim 2. In addition, these dependent claims define further distinguishing characteristics associated with the claimed invention. For example, Claim 3 recites that when a variation between the road surface μ slope of the front wheel and the road surface μ slope of the rear wheel is greater than or equal to a predetermined value, the control means either maintains or reduces the braking torque of the rear wheel, and when the variation is less than the predetermined value, the control means increases the braking torque of the rear wheel. Claim 5 recites that when a variation between the road surface μ slope of the front wheel and the road surface μ slope of the rear wheel is greater than or equal to a predetermined value, the control means increases the braking torque of the front wheel, and when the variation is less than the predetermined value, the control means either maintains or reduces the braking torque of the front wheel. Claim 6 recites that when a variation between the road surface μ slope of the turning inner side wheel and the road surface μ slope of the turning outer side wheel is greater than or equal to a predetermined value, the control means increases the braking torque of the turning outer side wheel, and when the variation is less than the predetermined value, the control means either maintains or reduces the braking torque of the turning outer side wheel. Claim 7 recites that when a variation between the road surface μ slope of the turning outer side wheel and the road

surface μ slope of the turning inner side wheel is greater than or equal to a predetermined value, the control means either maintains or reduces the braking torque of the turning inner side wheel, and when the variation is less than the predetermined value, the control means increases the braking torque of the turning inner side wheel.

Wakata et al. in view of Yamaguchi et al. does not disclose decreasing or increasing the braking torque based on differences between the road surface μ slope of different wheels together with the other claimed subject matter as recited in Claims 3, 5, 6 and 7. Rather, as noted above, Wakata et al. discloses measuring the wheel slip ratio of each individual wheel and adjusting the hydraulic pressure to each wheel with reference to a target slip ratio while Yamaguchi et al. discloses performing vehicle stabilizing control with reference to a peak μ value of the particular detected road surface.

It is believed that this application is in condition for allowance and such action is earnestly solicited.

Should any questions arise in connection with this application, or should the Examiner believe that a telephone conference with the undersigned would be helpful

in resolving any remaining issues pertaining to this application, the undersigned

respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

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